Subject: 12Pi is a 4 ohm speaker?
Posted by MArz on Sun, 21 Jun 2009 14:02:35 GMT
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Dear Wayne,
I am a newbie and therefore please excuse the confusion that i am in. Your site mentions the 12Pi subwoofer as being 4 ohms.. But arent you using 2 LAB 12 drivers which are rated at 6 ohms each?? so wouldnt that give a resultant impedance of 3 ohms if they are in parallel and 12 if they are in series???
Also your design is a push pull design .. does this mean that the while one speaker is connected IN phase the other is connected OUT of phase to get the push pull effect???
Also i wanted to build a pair of these to try out for my band so i really would appreciateif you could let me have the plans...V2? if possible pleeesssseee??
I earlier built a pair of the LAb horns but when i use them one per side while i do get copious quantities of BASS i tend to destroy them if i drive them too hard. I had connected the speakers in teh LAB horn in parallel first but after 2 successive blow outs i them connected them in series and now they are fine albeit at lower levels...
you have also mentioned that the Pi 12s are rated at 1600W RMS? Again the LAB 12s are only 400W drivers... is the increased power rating because of teh heat sink device???
Sorry to sound sooo confused but i am...
Awaiting your response eagerly...
Regards
MArz.

Subject: Re: 12Pi info
Posted by Wayne Parham on Sun, 21 Jun 2009 14:43:31 GMT
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I'll send plans in a separate E-Mail.

The impedance is raised due to horn loading. But impedance isn't a flat line, and you're right,

About power handling, the LAB12 is a good driver, but it won't even handle 400 watts indefinitely. Put a 40Hz sine wave into it at 400 watts and it will blow in less than 2 hours. Then again, music content has a much higher crest factor and isn't as hard on the drivers.

stock driver allows. We don't actually use the LAB12 anymore, we have an OEM version made that fits the cooling plug. When the cooling plug is installed, each PI-12 woofer will handle over 800 watts continuously, even if the signal has a low crest factor like a sine wave.

Subject: Re: 12Pi is a 4 ohm speaker?
Posted by Wayne-o on Sun, 21 Jun 2009 14:51:54 GMT
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Can cooling plug be used in your "lab12/modified" installed in a car audio aplication ? Many Thanks.

Subject: Cooling plugs
Posted by Wayne Parham on Sun, 21 Jun 2009 15:02:41 GMT
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Yes, it sure can. The cooling plug works just as well in a direct radiator as it does in a horn. It will provide twice the power handling ability when used in a direct radiating subwoofer.

The thing about basshorns is they reduce excursion and thereby decrease the cooling vent's effectiveness. So to me, this makes it even more important (mandatory) that a cooling plug be used in a basshorn application.

Subject: Re: 12Pi is a 4 ohm speaker?
Posted by MArz on Mon, 22 Jun 2009 06:44:41 GMT
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Thanks for the response wayne, however you didnt answer my question about the PUsh Pull arrangement and the connection of the drivers to get the push pull arrangement? Parallel? INphase? or out of phase?
Also Thank you for agreeing to send me the plans. I am awaiting them impatiently...

Subject: Re: 12Pi Push-Pull Drive
Posted by Wayne Parham on Mon, 22 Jun 2009 15:16:16 GMT
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The push-pull drive wires the drivers electrically out-of-phase, so cone motion is forward on one and backward on the other. They are then positioned in the horn so each provides positive pressure. In other words, the cone that is reverse-connected is also physically installed backwards.

You can see this in the plans - One driver is oriented so the front chamber and throat opening are on the front side, and the other has the throat on the back side. The wiring diagram shows the electrical reversal too.

This is done to reduce even harmonics. It works very well, as seen in the measurements. It just sounds cleaner and tighter. What is also very noticable is the absense of output below horn cutoff. It is very quiet below cutoff. Every other horn I measured, you could really hear a lot of sound even when the sweep was well below cutoff. The fundamental was very low, but distortion

was loud. The harmonics were presented to the horn and amplified by it. Not so with push-pull drive, it's dead quiet, clean. This is one of the real eye openers, or maybe I should say ear openers. It is an easy-to-identify proof that the concept is working. Measurements are very useful, but this is something you can immediately tell even without a measurement system.

amount. At the lowest frequencies, the second harmonic is well inside the passband, so this is very important. Some might say 2nd harmonics aren't too objectionable, and I wouldn't argue but I would say it is better that they didn't exist. The front chamber and horn folds produce a low-pass filter function which tends to reduce third harmonics. Most of them are outside the passband. Fourth harmonics are canceled by push-pull drive and are even further outside the passband, as are all higher harmonics. So this design is as free from distortion as you can possibly get. I know

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Subject: Re: 12Pi Push-Pull Drive
Posted by MArz on Fri, 03 Jul 2009 11:10:51 GMT
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Dear Wayne,
Still Awaiting the plans for the 12PI horn...
Could you please send it to me?
Thanks
MArz

Subject: Re: 12Pi Push-Pull Drive
Posted by Wayne Parham on Fri, 03 Jul 2009 16:19:56 GMT
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You've got mail!

Subject: Re: 12Pi is a 4 ohm speaker?
Posted by MArz on Sat, 04 Jul 2009 09:29:56 GMT
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Dear Wayne,
Thanks a ton for the plans. I have a few suggestions.
Could you not mount 2 sets of castors on the back panel and 2 conventional speaker handles on the top and 2 on the bottom panel in the place where you've cut out for the placement of your handle on one end and the castors on the other? this would really help when you need to physically lift the speaker over say a ledge in a doorway. also then one could just rest the speaker on its back and roll it to the van or to the venue....
Just a thought..
Also the mating of the panels seems to be done just flat joint. Isnt there a need to have a tongue

and groove joint especially in the the mating of the main speaker box panels?
Thanks a ton anyway....
MArz

Subject: Re: 12Pi is a 4 ohm speaker?
Posted by Wayne Parham on Sat, 04 Jul 2009 17:35:57 GMT
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You can mount castor wheels and handles wherever is convenient for you. We placed them where they are most convenient for loading and unloading a freight truck with a ramp. The wheels fit nicely on the ramp, between the two side edge guards. You can rock the basshorn back onto its castor wheels and push it like a hand truck.

As for panel fitment, we actually cut our on a CNC machine and use dados for every panel. This makes assembly a lot easier, and ensures a perfect fit. Our flat pack kits come this way too.

The plans we send out do not show dados for two reasons. One is to protect our investment in design time and CAD, CAM and CNC programming. We make flat pack kits available for those that want them. The other reason is if you're planning to cut out the parts yourself with a table saw and hand tools, you probably won't be cutting dadoes anyway.

If you buy flat pack kits from us, the plans aren't used as a cutting guide, only for identification of parts and where they go. If you want CNC cut parts, you should buy from us rather than trying to duplicate the CAD drawings and CNC programming. I've worked with outside shops that tried to do their own CAD and CNC from the non-dado plans, and they inevitably get some dimensions wrong somewhere. It becomes frustrating for both them and me.

On the other hand, if you're planning to try and cut out your own parts and build using a table saw and hand tools, you probably won't take the time to cut dados. Instead, carefully measure and draw lines on panels to indicate where things go, then use PL adhesive and wood screws for assembly. The screws apply clamping pressure while the PL adhesive dries. At least, that's how I built the prototype. Worked for me.

Subject: Re: 12Pi is a 4 ohm speaker?
Posted by dB on Wed, 08 Jul 2009 08:16:00 GMT
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Wayne Parham wrote on Sat, 04 July 2009 12:35
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Very good explanation from Wayne. I was bothering with that for years. Thanks. I would say that CNC programming can be ~/half the price of the parts for a small scale production (a pair or more). A lot of people don't know, when we talk about computers, they are used to go to a shop shelf and buy the CAD 'games'. So what is the worst part for Wayne and everybody (or better) is the turning point, when you can 'sell' the CADCAM drawings done and payed a few years back, not just (for) the initial prototype.

I would like to ask Wayne, about the LAB12s. Do they have foam surrounds, or was that changed already, for new versions.

Subject: Re: 12Pi development
Posted by Wayne Parham on Wed, 08 Jul 2009 15:08:19 GMT
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dB wrote on Wed, 08 July 2009 03:16I would like to ask Wayne, about the LAB12s. Do they have foam surrounds, or was that changed already, for new versions.
Yes, the LAB12 and PI-12 woofers have foam surrounds.

dB wrote on Wed, 08 July 2009 03:16Very good explanation from Wayne. I was bothering with that for years. Thanks. I would say that CNC programming can be ~/half the price of the parts for a small scale production (a pair or more). A lot of people don't know, when we talk about computers, they are used to go to a shop shelf and buy the CAD 'games'. So what is the worst part for Wayne and everybody (or better) is the turning point, when you can 'sell' the CADCAM drawings done and payed a few years back, not just (for) the initial prototype.
That's very true. It was not your typical development cycle of McBean model to cut and fit prototype to drawing. This one had significant design costs associated with it.

I spent tens of thousands of dollars on R&D for this basshorn, much of it on having the CAD and CAM drawings and models done. Over and above that, I spent another huge chunk of change on the patent for the cooling system. So when people get the plans, they're getting the benefit of a huge investment in time and money.

All of my loudspeakers have an associated investment of my time, my models, and my measurements. There's usually several hundred hours of design and testing involved. But that's mostly sweat equity, so to speak, with the other costs being limited to cost for the prototype, and

amortized costs of the measurement gear and so on.

thousands of man-hours in design, testing and associated support efforts. It's a pretty big deal.

Nothing else even comes close.
